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Filing Date	August 23, 2001
First Named Inventor	Niranjan Damera-Venkata
Art Unit	2621
Examiner Name	Alavi, Amir
Attorney Docket Number	10008301-1

ENCLOSURES   *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
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  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
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- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☑ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Wilson & Ham
Signature	*Thomas H. Ham*
Printed name	Thomas H. Ham
Date	August 25, 2006	Reg. No.	43,654

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Attorney Docket No. 10006301-1   PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Niranjan Damera-Venkata	Group Art Unit: 2621
Serial No. 09/935,457	Confirmation No. 9595
Filed: August 23, 2001	Examiner: Alavi, Amir

For: SYSTEM AND METHOD FOR EMBEDDING INFORMATION WITHIN A
PRINTED IMAGE USING BLOCK ERROR DIFFUSION HALFTONING

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REVISED APPEAL BRIEF UNDER 37 C.F.R. 41.37 IN RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF

Sir:

A Notice of Appeal was filed in this case on June 21, 2005. An Appeal Brief was filed on August 19, 2005.

The present Revised Appeal Brief is being filed in response to a Notification of Non-Compliant Appeal Brief mailed on July 27, 2006. This Notification was issued on the grounds that the originally filed Appeal Brief did not include all of the items required under 37 CFR 41.37(c), or the items are not under the proper heading or in the proper order, as well as other grounds. The Revised Appeal Brief meets the requirements of 37 C.F.R. 41.37.

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I.   Real Party in Interest

The real party in interest in this appeal is Hewlett-Packard Company, a
Delaware Corporation, having a principal place or place of business in Palo Alto,
California.

II.   Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress
that will directly affect, or be directly affected by, or have a bearing on the Board's
decision in the present Appeal.

III.   Status of Claims

Claims 1-21 were originally filed with the application on August 23, 2001. In
the Amendment and Response to Office Action filed on December 14, 2004, claims 1,
9 and 17 were amended. No claims have been amended, canceled, or added for
purposes of this Appeal.

Claims 1, 5-6, 8, 9, 13, 14, 16, 17 and 21 stand rejected under 35 U.S.C.
102(e) as allegedly being anticipated by Brunk (U.S. Patent No. 6,694,041 B1).
Furthermore, claims 2-4, 7, 10-12, 15 and 18-20 stand rejected under 35 U.S.C.
103(a) as allegedly being unpatentable over Brunk in view of Chang (U.S. Patent No.
6,256,398 B1).

This Appeal is made with regard to pending claims 1-21.

IV.   Status of Amendments

No amendments were filed subsequent to final rejection.

V.   Summary of Claimed Subject Matter

The claimed invention is a system and method for embedding information within an input image using specific type pixel blocks of the input image to selectively embed the information into the input image (see Applicant's specification from page 2, line 32, to page 3, line 1). According to an embodiment of the invention, as recited in the independent claim 1, a method of embedding information in images comprises detecting (408) first type pixel blocks of an input image (See page 7, lines 5-7) and modulating (412) the first type pixel blocks of the input image based on the information to produce an output image (See page 10, lines 8-10). Each of the first type pixel blocks includes a plurality of pixels (See page 7, lines 7-10). The first type pixel blocks are dependent on pixel values within the first type pixel blocks (See page 9, lines 7-19). The output image includes the input image and the information.

According to an embodiment of the invention, as recited in the independent claim 9, a system for embedding information in images comprises a pixel block type detector (116) and a block modulator (120). The pixel block type detector (116) is configured to detect first type pixel blocks of an input image (See page 7, lines 5-7). Each of the first type pixel blocks includes a plurality of pixels (See page 7, lines 7-10). The first type pixel blocks are dependent on pixel values within the first type pixel blocks (See page 9, lines 7-19). The block modulator (120) is configured to modulate the first type pixel blocks of the input image based on the information to be embedded to produce an output image (See page 10, lines 8-10), which includes the input image and the information.

According to an embodiment of the invention, as recited in the independent claim 17, a method of embedding information in images comprises detecting (408) first type pixel blocks of an input image (See page 7, lines 5-7), modulating (412) the first type pixel blocks of the input image based on the information to produce an output image (See page 10, lines 8-10) and converting (414) pixels of the input image into halftones (See page 7, lines 16-23). The converting (414) includes diffusing halftone errors associated with the first type pixel blocks to neighboring pixel blocks of the first type pixel blocks on a block-by-block basis. Each of the first type pixel blocks includes a plurality of pixels (See page 7, lines 7-10). The first type pixel

blocks are dependent on pixel values within the first type pixel blocks (See page 9, lines 7-19). The output image includes the input image and the information.

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1, 5-6, 8, 9, 13, 14, 16, 17 and 21 are anticipated under 35 U.S.C. 102(e) by Brunk.

Whether claims 2-4, 7, 10-12, 15 and 18-20 are unpatentable over Brunk in view of Chang.

VII. Argument

A. Rejection of Claims 1 and 9 Under 35 U.S.C. §102(e)

The independent claims 1 and 9 were rejected under 35 U.S.C. §102(e) in the Final Office Action of April 21, 2005 as allegedly being anticipated by Brunk. The independent claim 1 recites a method of embedding information in images comprising:

> *"detecting first type pixel blocks of an input image, each of said first type pixel blocks including a plurality of pixels, said first type pixel blocks being dependent on pixel values within said first type pixel blocks; and*
> *   modulating said first type pixel blocks of said input image based on said information to produce an output image, said output image including said input image and said information."*

As explained below, the recited "*detecting*" and "*modulating*" elements of the independent claim 1 are not disclosed in Brunk. Thus, the independent claim 1 is not anticipated by Brunk.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP §2131. As correctly stated in the Final Office Action, Brunk does disclose "a modified error diffusion method that embeds a watermark comprising a set of binary values at specified dot locations in a binary image." Furthermore, the method of Brunk does assign "to these locations the corresponding values of the

watermark". However, the specified dot locations used by the Brunk method are pixel locations, as described in column 4, lines 1-14. Thus, the Brunk method operates at the pixel level, not at the level of pixel blocks, as is the case in the method of the independent claim 1. Consequently, Brunk does not disclose the limitation of *"detecting first type pixel blocks of an input image, each of said first type pixel blocks including a plurality of pixels, said first type pixel blocks being dependent on pixel values within said first type pixel blocks,"* as recited in the independent claim 1. Similarly, Brunk does not disclose the limitation of *"modulating said first type pixel blocks of said input image based on said information to produce an output image, said output image including said input image and said information,"* as further recited in the independent claim 1. Since each recited limitation of the independent claim 1 is not disclosed in the cited reference of Brunk, the independent claim 1 is not anticipated by Brunk.

In response to Applicant's previous argument, the Office Action states that "Examiner considers the cited prior art, namely, Brunk-USPN-6,694,041 B1, column 3, lines 56-65, to clearly address pixel blocks, as such, wherein a set of binary values, being indeed more than one and being a set constitutes blocks." However, the "set of binary values" in Brunk refers to a watermark, which is embedded at specified dot locations in a binary image, as stated in column 3, lines 57-58. Thus, the "set of binary values" has nothing to do with the limitation of *"detecting first type pixel blocks of an input image"* or the limitation of *"modulating said first type pixel blocks of said input image based on said information to produce an output image,"* as recited in the independent claim 1.

The independent claim 9 recites similar limitations as the independent claim 1. The independent claim 9 recites a system for embedding information in images comprising:

> *"a pixel block type detector that is configured to detect first type pixel blocks of an input image, each of said first type pixel blocks including a plurality of pixels, said first type pixel blocks being dependent on pixel values within said first type pixel blocks; and*
> *a block modulator that is configured to modulate said first type pixel blocks of said input image based on said information to be embedded to produce an output image, said output image including said input image and said information."*

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Thus, the above remarks are also applicable to the independent claims 9. As such, the independent claim 9 is also not anticipated by Brunk.

B. Rejection of Claims 5, 13 and 17 Under 35 U.S.C. §102(e)

Similar to the independent claims 1 and 9, the independent claim 17 was rejected under 35 U.S.C. §102(e) in the Final Office Action as allegedly being anticipated by Brunk. The independent claim 17 recites the *"detecting"* and *"modulating"* limitations of the independent claim 1. Thus, the independent claim 17 is also not anticipated by Brunk, as explained above with respect to the independent claim 1.

In addition to the *"detecting"* and *"modulating"* limitations, the independent claim 17 further recites the limitation of *"converting pixels of said input image into halftones, including diffusing halftone errors associated with said first type pixel blocks to neighboring pixel blocks of said first type pixel blocks on a block-by-block basis."* As correctly stated in the Final Office Action, Brunk does disclose "a modified error diffusion method that embeds a watermark comprising a set of binary values at specified dot locations in a binary image." However, the modified error diffusion method of Brunk is performed on pixels using a new set of error diffusion weights, as illustrated in Fig. 3 and described in column 4, lines 13-24. The "X" in Fig. 3 of Brunk represents the pixel location currently being processed, as explained in column 3, lines 21 and 22. Thus, Brunk does not disclose *"diffusing halftone errors associated with said first type pixel blocks to neighboring pixel blocks of said first type pixel blocks on a block-by-block basis"* (emphasis added), as recited in the independent claim 17. Consequently, the independent claim 17 is not anticipated by Brunk.

The dependent claims 5 and 13 recite similar limitations as the independent claim 17. The dependent claim 5 recites *"a step of diffusing halftone errors of each pixel block of said input image into neighboring pixel blocks of said input image on a pixel block by pixel block basis."* The dependent claim 13 recites *"an error diffusion halftoner coupled to said block modulator, said error diffusion halftoner being*

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configured to diffuse halftone errors of each pixel block of said input image into
neighboring pixel blocks of said input image on a pixel block by pixel block basis."
Thus, the above remarks are also applicable to the dependent claims 5 and 13.
Consequently, the dependent claims 5 and 13 are also not anticipated by Brunk.

C. Rejection of Claims 6, 14 and 21 Under 35 U.S.C. §102(e)

The dependent claims 6, 14 and 21 were also rejected under 35 U.S.C. §102(e)
in the Final Office Action as allegedly being anticipated by Brunk. The dependent
claim 6 recites "wherein said step of modulating said first type pixel blocks of said
input image includes replacing said first type pixel blocks of said input image with dot
shape blocks such that said information is represented by said dot shape blocks."
The cited reference of Brunk does not disclose such a limitation, and thus, the
dependent claim 6 is not anticipated by Brunk.

As correctly stated in the Office Action, the method of Brunk "assigns to dot
locations the corresponding values of the watermark." However, as explained above
with respect to the independent claim 1, the method of Brunk operates at the pixel
level, not at the pixel block level. Thus, Brunk does not disclose "replacing said first
type pixel blocks of said input image with dot shape blocks," as recited in the
dependent claim 6. Consequently, the dependent claim 6 is not anticipated by Brunk.

The dependent claims 14 and 21 recite similar limitations as the dependent
claim 6. The dependent claim 14 recites "wherein said block modulator is configured
to replace said first type pixel blocks of said input image with dot shape blocks such
that said information is represented by said dot shape blocks." The dependent claim
21 recites "wherein said step of modulating said first type pixel blocks of said input
image includes replacing said first type pixel blocks of said input image with dot
shape blocks such that said information is represented by said dot shape blocks."
Thus, the above remarks are also applicable to the dependent claims 14 and 21.
Consequently, the dependent claims 14 and 21 are also not anticipated by Brunk.

D. Rejection of Claims 2-4, 7, 8, 10-12, 15, 16 and 18-20 Under 35 U.S.C. §102(e) or Under 35 U.S.C. §103(a)

The dependent claims 2-4, 7, 8, 10-12, 15, 16 and 18-20 were rejected under 35 U.S.C. §102(e) as being anticipated by Brunk or under 35 U.S.C. §103(a) as being unpatentable over Brunk in view of Chang.

Each of the dependent claims 2-4, 7, 8, 10-12, 15, 16 and 18-20 depends on one of the independent claims 1, 9 and 17. As such, these dependent claims include all the limitations of their respective base claims. Therefore, these dependent claims 2-4, 7, 8, 10-12, 15, 16 and 18-20 are allowable for at least the same reasons as their respective based claims.

SUMMARY

The independent claim 1 is not anticipated by Brunk because the method of Brunk operates at the pixel level, not at the pixel block level. Thus, Brunk does not disclose the limitation of *"detecting first type pixel blocks of an input image"* and the limitation of *"modulating said first type pixel blocks of said input image based on said information to produce an output image,"* as recited in the independent claim. Since the independent claim 9 recites similar limitations as the independent claim 1, the independent claim 9 is also not anticipated by Brunk. In addition, the independent claim 17 is not anticipated by Brunk because Brunk discloses an error diffusion method that operates on pixels, not on pixel blocks. Thus, Brunk does not disclose the limitation of *"diffusing halftone errors associated with said first type pixel blocks to neighboring pixel blocks of said first type pixel blocks on a block-by-block basis,"* as recited in the independent claim 17. Since the dependent claims 5 and 13 recite similar limitations as the independent claim 17, the dependent claim 5 and 13 are also not anticipated by Brunk. Because the method of Brunk operates at the pixel level, not at the pixel block level, Brunk also does not disclose the limitation of *"wherein said step of modulating said first type pixel blocks of said input image includes replacing said first type pixel blocks of said input image with dot shape blocks such that said information is represented by said dot shape blocks,"* as recited in the

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dependent claim 6. Since the dependent claims 14 and 21 recite similar limitations as the dependent claim 6, the dependent claim 14 and 21 are also not anticipated by Brunk.
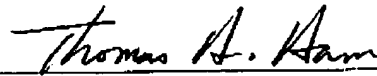
For all the foregoing reasons, it is earnestly and respectfully requested that the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1-21, so that this case may be allowed and pass to issue in a timely manner.

Respectfully submitted,

Niranjan Damera-Venkata

Date: August 25, 2006   By: _Thomas H. Ham_

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VIII.   Claims Appendix

1.   A method of embedding information in images comprising:

detecting first type pixel blocks of an input image, each of said first type pixel blocks including a plurality of pixels, said first type pixel blocks being dependent on pixel values within said first type pixel blocks; and

modulating said first type pixel blocks of said input image based on said information to produce an output image, said output image including said input image and said information.

2.   The method of claim 1 wherein said step of detecting said first type pixel blocks of said input image includes detecting minority pixel blocks of said input image, said minority pixel blocks being pixel blocks that include a majority of pixels that contrast with an image background.

3.   The method of claim 2 wherein said minority pixel blocks include a majority of dark pixels.

4.   The method of claim 2 wherein said minority pixel blocks includes a majority of light pixels.

5.   The method of claim 1 further comprising a step of diffusing halftone errors of each pixel block of said input image into neighboring pixel blocks of said input image on a pixel block by pixel block basis.

1   6.   The method of claim 1 wherein said step of modulating said first type pixel

2   blocks of said input image includes replacing said first type pixel blocks of said input

3   image with dot shape blocks such that said information is represented by said dot

4   shape blocks.

1   7.   The method of claim 6 wherein some of said dot shape blocks represents

2   synchronization data.

1   8.   The method of claim 6 wherein some of said dot shape blocks represents binary

2   data.

1   9.   A system for embedding information in images comprising:

2   a pixel block type detector that is configured to detect first type pixel

3   blocks of an input image, each of said first type pixel blocks including a plurality of

4   pixels, said first type pixel blocks being dependent on pixel values within said first

5   type pixel blocks; and

6   a block modulator that is configured to modulate said first type pixel

7   blocks of said input image based on said information to be embedded to produce an

8   output image, said output image including said input image and said information.

1   10.   The system of claim 9 wherein said pixel block type detector is configured to

2   detect minority pixel blocks of said input image, said minority pixel blocks being

3   pixel blocks that include a majority of pixels that contrast with an image background.

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1   11.   The system of claim 10 wherein said minority pixel blocks include a majority of

2   dark pixels.

1   12.   The system of claim 10 wherein said minority pixel blocks includes a majority

2   of light pixels.

1   13.   The system of claim 9 further comprising an error diffusion halftoner coupled to

2   said block modulator, said error diffusion halftoner being configured to diffuse

3   halftone errors of each pixel block of said input image into neighboring pixel blocks

4   of said input image on a pixel block by pixel block basis.

1   14.   The system of claim 9 wherein said block modulator is configured to replace

2   said first type pixel blocks of said input image with dot shape blocks such that said

3   information is represented by said dot shape blocks.

1   15.   The system of claim 14 wherein some of said dot shape blocks represents

2   synchronization data.

1   16.   The system of claim 14 wherein some of said dot shape blocks represents binary

2   data.

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1   17.   A method of embedded information in images comprising:

2   detecting first type pixel blocks of an input image, each of said first

3   type pixel blocks including a plurality of pixels, said first type pixel blocks being

4   dependent on pixel values within said first type pixel blocks;

5   modulating said first type pixel blocks of said input image based on

6   said information to produce an output image, said output image including said input

7   image and said information; and

8   converting pixels of said input image into halftones, including

9   diffusing halftone errors associated with said first type pixel blocks to neighboring

10   pixel blocks of said first type pixel blocks on a block-by-block basis.

1   18.   The method of claim 17 wherein said first type pixel blocks of said input image

2   include minority pixel blocks, said minority pixel blocks being pixel blocks that

3   include a majority of pixels that contrast with an image background.

1   19.   The method of claim 18 wherein said minority pixel blocks include a majority of

2   dark pixels.

1   20.   The method of claim 18 wherein said minority pixel blocks includes a majority

2   of light pixels.

1   21.   The method of claim 17 wherein said step of modulating said first type pixel

2   blocks of said input image includes replacing said first type pixel blocks of said input

3   image with dot shape blocks such that said information is represented by said dot

4   shape blocks.

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IX.   Evidence Appendix

NONE

X.   Related Proceedings Appendix

NONE